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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,697	09/09/2008	Silvia Ghidini	10880.0409	3101

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
PINKNEY, DAWAYNE	

ART UNIT	PAPER NUMBER
2873	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,697	GHIDINI ET AL.	
	Examiner	Art Unit	
	DAWAYNE A. PINKNEY	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-76* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *73* is/are allowed.

6)☒ Claim(s) *39-47, 58, 60-61, 63-72 and 74-76* is/are rejected.

7)☒ Claim(s) *48-57,59 and 62* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/13/2011*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 01/13/2011 has been considered by the examiner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 39-42, 45-47 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betty (US 2004/0008965) in view of Otake et al. (US 2004/0052491).

Regarding **claims 39 and 63**, Betty discloses, a method for modulating the intensity of a light beam (Fig. 1) comprising the steps of:

a) splitting the light beam (134) into a first (136a) and second light beam (136b);

b) propagating said first (136a) and second light beams (136b) along a first (136a) and a second optical path (136b), respectively;

c) combining (140) said first (136a) and second light beam (136b) into an output light beam (Paragraphs 0027 and 0031) after propagation along the first (136a) and second optical paths (136b); and

d) introducing through Franz-Keldysh effect (Paragraphs 0026, 0030, and 0047-0048) a relative phase shift between the first and second optical paths ((Paragraphs 0026, 0030, and

0047-0048))so as to obtain an intensity modulation of the output light beam (Paragraphs 0026, 0030, and 0047-0048);

the step of introducing through the Franz-Keldysh effect (Paragraphs 0026, 0030, and 0047-0048) being carried out by supplying a first modulation voltage superimposed to a first bias voltage to the group IV material of the first optical path (Paragraphs 0026, 0030, and 0047-0048) and a second modulation voltage superimposed to a second bias voltage to the group IV material to the second optical path (Paragraphs 0026, 0030, and 0047-0048).

Betty does not disclose the group IV material is a group IV semiconductor material.

Otake teaches, from the same field of endeavor that in an optical modulator that it would have been desirable to make the group IV material is a group IV semiconductor material (Paragraph 0048 and Claim 11) for the purpose of reducing signal loss and difference in transmission rate (Paragraph 0011, lines 4-9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the group IV material is a group IV semiconductor material as taught by the optical modulator of Otake in the optical modulator of Betty since Otake teaches it is known to include this feature in an optical modulator for reducing signal loss and difference in transmission rate (Paragraph 0011, lines 4-9).

Regarding **claims 40 and 64**, Betty in view of Otake discloses and teaches as set forth above, and Betty further discloses, the method and optical modulator according to claims 39 and 63, wherein in step a) the light beam is split into the first and second light beams of substantially the same optical power (Paragraphs 0027-0028, and 142).

Regarding **claim 41**, Betty in view of Otake discloses and teaches as set forth above, and Betty further discloses, the optical modulator according to claim 39, wherein the first (126a) and second waveguide arms (126b) are substantially of the same length (Paragraph 0032).

Regarding **claims 42 and 47**, Betty in view of Otake discloses and teaches as set forth above, and Otake further teaches from the same field of endeavor that in an it would have been desirable to make the group IV semiconductor material of each core region is selected from the group of Si and Ge and a combination thereof (Paragraphs 0048, 0070 and Claims 11-12), and a silicon substrate with said optical modulator integrated thereon (Paragraphs 0048-0049 and 0070) for the purpose of reducing signal loss and difference in transmission rate (Paragraph 0011, lines 4-9).

Regarding **claim 45**, Betty in view of Otake discloses and teaches as set forth above, and Betty further discloses, the optical modulator according to claim 39, wherein the driving circuit is adapted to supply the first and second modulation voltage as electric signals having the same waveform (Paragraphs 0027 and 0029).

Regarding **claim 46**, Betty in view of Otake discloses and teaches as set forth above, and Betty further discloses, the optical modulator according to claim 45, wherein the driving circuit is adapted to supply the electric signals with inverted sign (Paragraph 0031).

Regarding **claim 65**, Betty in view of Otake discloses and teaches as set forth above, and Betty further discloses, the method according to claim 63, further comprising a step e) of supplying to at least one of the first and second optical paths a continuous wave voltage for introducing a further prefixed relative phase shift between the first and second optical paths (Paragraph 0022).

4. Claims 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betty (US 2004/0008965) in view of Otake et al. (US 2004/0052491) as applied to claim 39 above, in view of Chang et al. (US 5,309,532).

Betty in view of Otake remains as applied to **claim 39 above**.

Betty in view of Otake does not disclose a third electrode structure associated with one of the first and second waveguide arms, and the driving circuit is adapted to supply to the third electrode structure a continuous wave voltage.

Chang teaches, from the same field of endeavor that in an optical modulator having an optical splitter, first and second waveguide arms, and first and second electrodes that it would be desirable to include a third electrode structure associated with one of the first and second waveguide arms (Col. 6, lines 4-15), and the driving circuit is adapted to supply to the third electrode structure a continuous wave voltage (Col. 6, lines 4-15) for the purpose of providing an optical modulator with reduced costs (Col. 1, lines 20-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a third electrode structure associated with one of the first and second waveguide arms, and the driving circuit is adapted to supply to the third electrode structure a continuous wave voltage as taught by the optical modulator of Chang in the combination of Betty in view of Otake since Chang teaches it is known to include these features in an optical modulator for providing an optical modulator with reduced costs (Col. 1, lines 20-22).

5. Claims 58 and 60-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betty (US 2004/0008965) in view of Otake et al. (US 2004/0052491) as applied to claim 39 above, in view of Phoenix et al. (US 5,764,765).

Betty in view of Otake remains as applied to **claim 39 above**.

Betty in view of Otake does not disclose a transmitting station comprising an optical transmitter device, the optical transmitter device comprising an optical source for providing an optical light beam at a predetermined wavelength and an optical modulator, associated with the optical source to modulate the intensity of the optical light beam.

Phoenix teaches, from the same field of endeavor that in an optical modulator that it would be desirable to include in the optical modulator in a transmitting station (Figs. 9a-b) comprising an optical transmitter device (Fig. 9a), the optical transmitter device comprising an optical source (91) for providing an optical light beam at a predetermined wavelength (Col. 6, lines 31-50) and an optical modulator (Col. 7, lines 3-65), associated with the optical source to modulate the intensity of the optical light beam (Col. 6, lines 31-37, Col. 7, lines 1-63, and Figs. 9a-b) for the purpose of providing an effective transmitting station (Col. 1, lines 48-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the optical modulator a transmitting station comprising an optical transmitter device, the optical transmitter device comprising an optical source for providing an optical light beam at a predetermined wavelength and an optical modulator, associated with the optical source to modulate the intensity of the optical light beam as taught by the optical modulator of Phoenix in the combination of Betty in view of Otake since Phoenix

teaches it is known to include these features in an optical modulator for providing an effective transmitting station (Col. 1, lines 48-50).

Regarding **claims 60-61**, Betty, Otake and Phoenix discloses and teaches as set forth above, and Phoenix further teaches, an optical communication system (Figs. 9a-b) comprising a transmitting station (Fig. 9a) according to claim 58 (see rejection of claim 58 above), and an optical communication line having a first end coupled to the transmitting station (Col. 6, lines 31-37, Col. 7, lines 1-63, and Fig. 9a), and a receiving station coupled to a second end of the optical communication line (Col. 6, lines 31-37, Col. 7, lines 1-63, and Fig. 9b) for the purpose of providing an effective transmitting station (Col. 1, lines 48-50).

6. Claims 66-72 and 74-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betty (US 2004/0008965) in view of Otake et al. (US 2004/0052491) as applied to claim 63 above, in view of Yu (US 5,778,113; already of record).

Betty in view of Otake remains as applied to **claim 63 above**.

Betty in view of Otake does not disclose a relative phase shift of π or an integer odd multiple thereof is introduced for obtaining a 0 logic state and a relative phase shift of zero or an integer even multiple of π is introduced for obtaining a 1 logic state, the first and second modulation voltages are electric signals having the same waveform, and the electric signals have an inverted sign.

Yu teaches, from the same field of endeavor that in a method for modulating the intensity of a light beam that it would be desirable to include a relative phase shift of π or an integer odd multiple thereof is introduced for obtaining a 0 logic state and a relative phase shift of zero or an

integer even multiple of π is introduced for obtaining a 1 logic state (Col. 3, lines 10-22), the first and second modulation voltages are electric signals having the same waveform (Col. 6, lines 25-35), and the electric signals have an inverted sign (Col. 6, lines 45-59) for the purpose of providing a high quality method of modulating the intensity of a light beam (Col. 1, lines 10-11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a relative phase shift of π or an integer odd multiple thereof is introduced for obtaining a 0 logic state and a relative phase shift of zero or an integer even multiple of π is introduced for obtaining a 1 logic state, the first and second modulation voltage are electric signals having the same waveform, and the electric signals have an inverted sign as taught by the method for modulating the intensity of a light beam of Yu in the combination of Betty in view of Otake since Yu teaches it is known to include this feature in the method of modulating the intensity of a light beam for providing a high quality method of modulating the intensity of a light beam (Col. 1, lines 10-11).

Regarding **claims 69-72 and 74-76**, Betty, Otake and Yu discloses and teaches as set forth above, and Betty further discloses, the first and second bias voltages and the first and second modulation voltages are such as to induce through the Franz-Keldysh effect an overall phase shift in the first and second optical paths which is substantially the same in absolute value but opposite in sign when passing from the 1 logic state to the 0 logic state, and vice versa (Paragraphs 0030-0031), the first bias voltage is substantially the same as the second bias voltage (Paragraphs 0030-0031), the peak to peak amplitude of the first modulation voltage is substantially the same as the peak to peak amplitude of the second modulation voltage

(Paragraphs 0030-0031), and the first bias voltage is different from the second bias voltage (Paragraphs 0026, 0030-0031, and 0047-0048).

Response to Arguments

7. Applicant's arguments with respect to claims 39-76 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claim 73 is allowed.

9. Claims 48-57, 59 and 62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: none of the prior art either alone or in combination disclose or teach of the claimed. Regarding **claim 48**, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include an electro-optical converter in an optical modulator to convert the input light beam into a corresponding electrical signal so as to reduced the attenuation loss of a modulated optical light beam.

11. Regarding **claim 59**, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include an electro-optical converter in an optical modulator to convert the input light beam at a generic wavelength into a corresponding modulation electrical signal, and to couple the electro-optical converter to an optical modulator to supply a corresponding modulation electric signal to a driving circuit of a optical modulator so as to reduced the attenuation loss of a modulated optical light beam.

12. The following is an examiner's statement of reasons for allowance: none of the prior art either alone or in combination disclose or teach of the claimed . Regarding **claim 73**, in the examiner's opinion it would not have been obvious to one of ordinary skill in the art at the time the invention was made to make the peak to peak amplitude of a first modulation voltage different from the peak to peak amplitude of a second modulation voltage in method for modulating the intensity of a light beam so as to reduced the attenuation loss of a modulated optical light beam.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAWAYNE A. PINKNEY whose telephone number is (571)270-1305. The examiner can normally be reached on Monday-Thurs. 8 a.m.- 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DaWayne A Pinkney/
Examiner, Art Unit 2873
03/25/2011